



Part 1

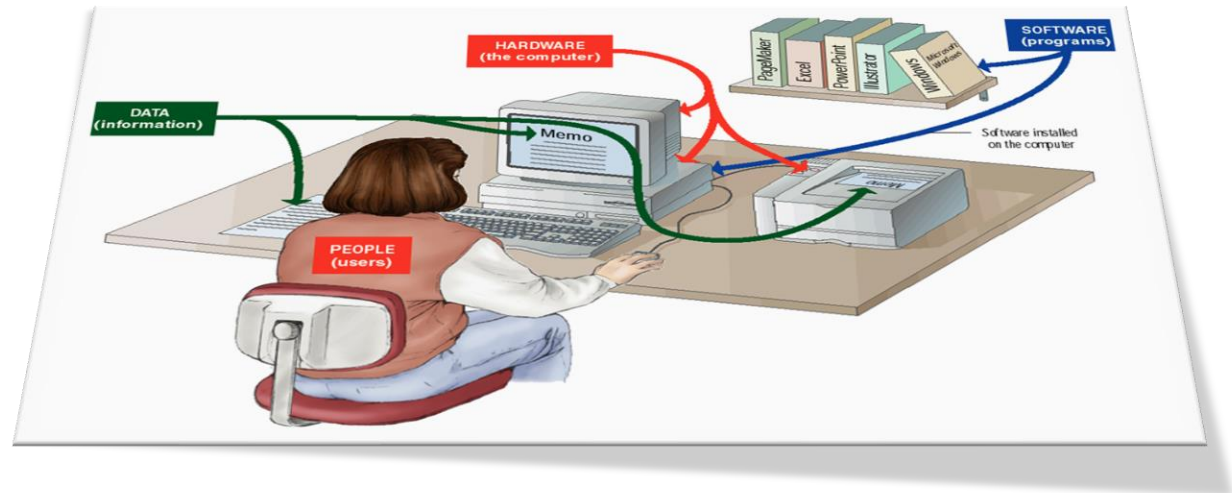
Computer

A computer is an electronic device that processes data, converting it into information that is useful to people.

Any computer regardless of its type is controlled by **programmed instructions**, which give the machine a **purpose** and **tell it what to do**.

A complete computer system consists of four parts:

1. Hardware
2. Software
3. Users
4. Data



1- Hardware:

The physical devices that make up the computer are called hardware.

(Hardware is any part of the computer you can touch) .

- A computer's hardware consists of **interconnected electronic devices** that you can use to:
 1. Control the computer's operation,
 2. Input.
 3. Output.



2- Software:

Software is a set of instructions that makes the computer perform tasks.

(In other words, software tells the computer what to do).

- Some programs exist primarily for the computer's use, helping it **perform tasks** and **mange its own resources**.
- Other types of programs exist for user, enabling him or her to perform tasks such as **creating documents**.



3- Users:

People are the computer operators, (also known as users).

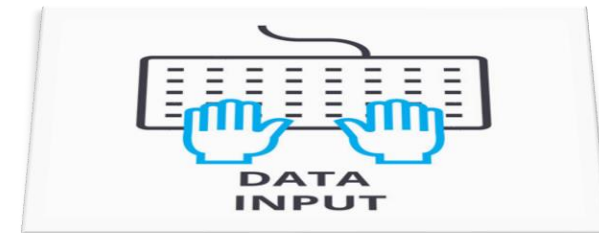
- It can be argued that some computer systems are complete without a person's involvement; however, no computer is totally autonomous.
- Even if a computer can do its job without a person sitting in front of it, people still design, build program, and repair computer systems.



4- Data:

data consists (letters, numbers, images, sounds) or anything of information, which by themselves may not make sense to a person.

- The computer reads and stores data of all kinds where words, numbers, images, or sound in the form of numbers.



Converting the text "hope" into binary

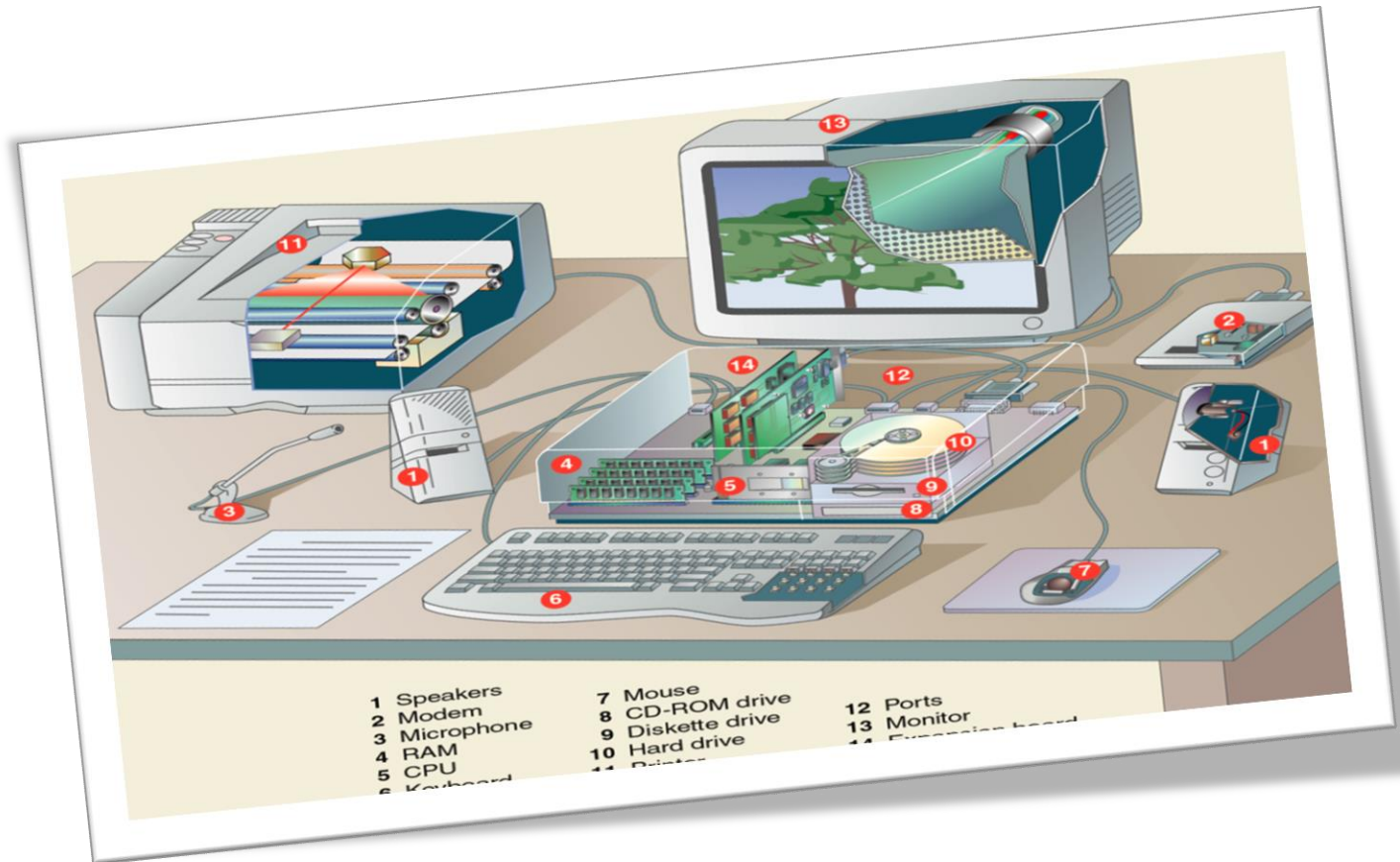
Characters:	h	o	p	e
ASCII Values:	104	111	112	101
Binary Values:	01101000	01101111	01110000	01100101
Bits:	8	8	8	8

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Computer Hardware

The hardware has many parts, but the critical components fall into one of four categories:

1. Input and output devices.
2. Memory.
3. Processor.
4. Storage.



Input and output devices

A computer would be **useless if you could not interact with it** because the machine could not receive instructions or deliver the results of its work.

1- Input devices:

Accept data and instructions from the user or from another computer system.

- The **most common input device** is the keyboard, which accepts letters, numbers, and commands from the user.
- Another important type of input device is the mouse, which lets you select options from on-screen menus.



2- Output devices:

Return processed data to the user or to another computer system.

- The **most common output devices** are the monitor and the printer.
- The computer **sends output to the monitor** when the user needs only to see the output.
- It **sends output to the printer** when the user requests a paper copy also called a hard copy of a document.



What is RAM?

Random-access memory, often abbreviated as **RAM**, is a hardware element of a computer where programs, operating systems, and data that are currently being used are stored so that the processor can retrieve it quickly.

- Think of RAM as a memory bank for the computer. The amount of multi-tasking you can do and the games you can play on the computer or phone depend heavily on the **amount of RAM available**



What is ROM?

ROM, on the other hand, is a type of memory where data has been pre-recorded.

It contains the programming that helps a computer or smartphone 'boot up'.

- Commonly referred to as **Read Only Memory**, ROM retains its contents even after the computer is turned off; that's why a computer can be switched on in the first place



Processor:

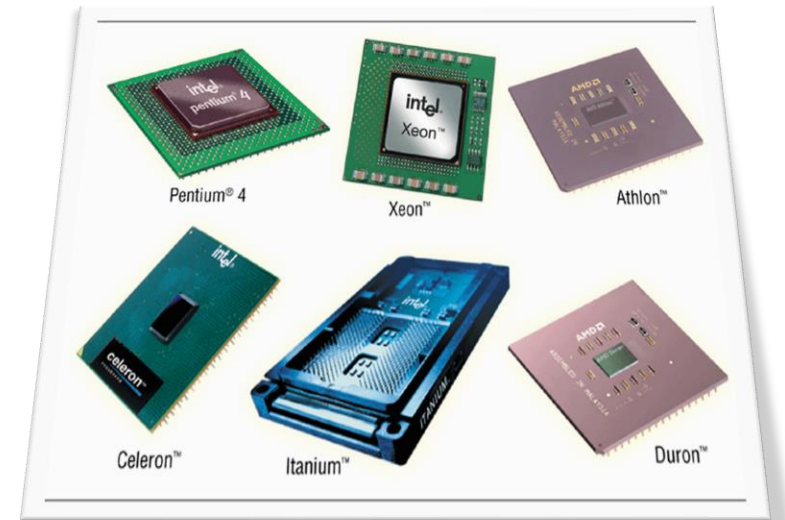
The processor is like the **brain** of the computer;

it **organizes** and **carries out instructions** that come from either the user or the software.

➤ In a **personal computer**, the processor usually consists of **one or more microprocessors**, which are slivers of silicon or other material etched with many tiny electronic circuits.

CPU consists of:

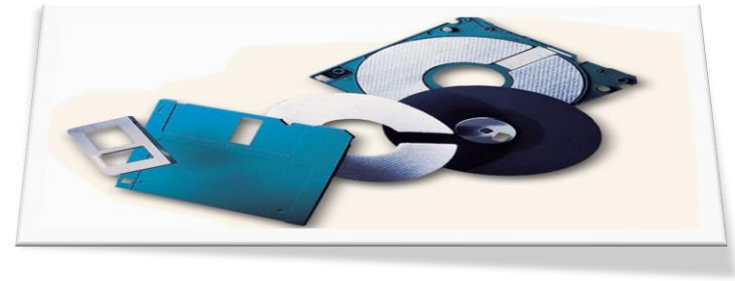
1. **Arithmetic and Logic Unit.**
2. **Control Unite.**



Storage :

A computer can function with only processing, memory, input and output devices.

- To be really useful, however, a computer also **needs a place to keep program files** and related data when they are not in use.
- The purpose of storage is to **hold data permanently**.
- There are many types of storage devices, including **tape drives, optical drives, and removable hard drive**.
- However, the most common storage medium is the **magnetic disk**.

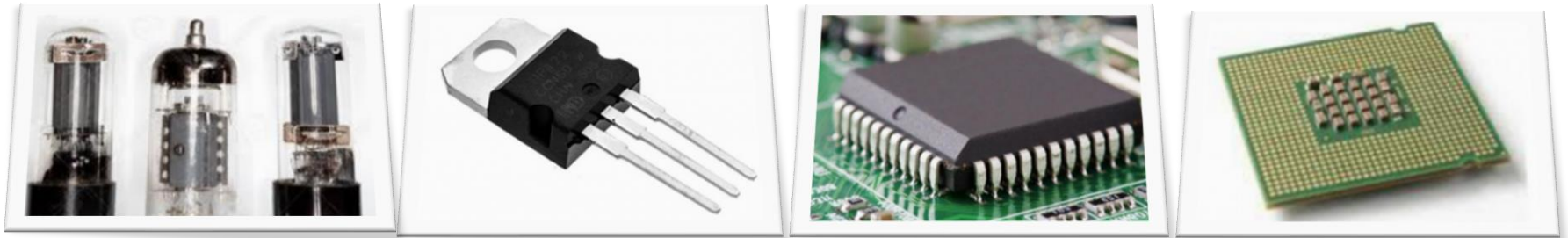


There are three major distinctions between storage and memory:

1. There is **more room in storage** than in memory.
2. Contents are **retained in storage** when the computer is turned off.
3. Storage is **very slow** compared to memory.

What is computer generation?

The **development** of this complex structure (**computer**) began approximately **1940** with the very first Computer Generation and has since evolved. The computer revolution is always marked as a technological breakthrough that has fundamentally altered the unique way for computers work, culminating in ever smaller, cheaper, increasingly efficient, and much more efficient machines. Reference is often made to the development of computer technology in relation to the various types of computing devices. **The computer revolution completely changed the way computers function, resulting in ever smaller, cheaper, more efficient, and much more secure computers.**



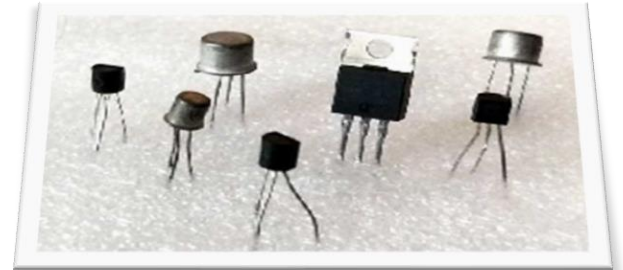
First Generation 1939 -1953:

- 1- Used vacuum tubes to provide electronic circuit for internal operations.
- 2- The first computer of this generator is called **ENIAC (Electronic Numerical Integrator and Computer)** in 1946.
- 3- Internal storage for these computers used **magnetic drums**. Internal storage capacity was **limited**.
- 4- **Punched cards** were used to enter data and program into the machines.
- 5- Early first generation computers were given instructions coded in **machine language**.



Second Generation 1954 – 1962:

- 1- **Transistors replaced the vacuum tubes of first generation machines.**
- 2- **Magnetic cores replaced magnetic drums as internal storage units.**
- 3- **Magnetic tapes replaced punched card for input and output.**
- 4- **High-level programming language invention like (FORTRAN) and (COBOL).**



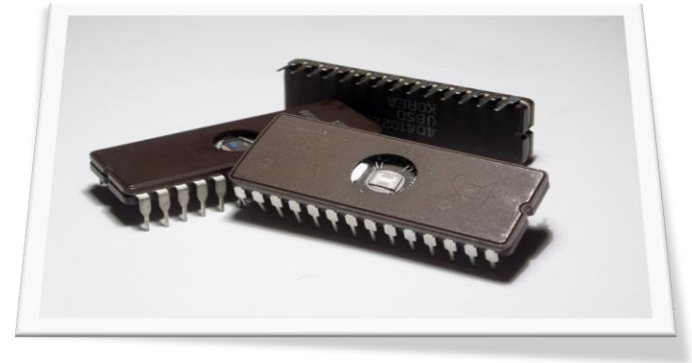
Third Generation 1963 -1970:

- 1- Integrated circuits** replaced transistors in third generation computer.
- 2- Internal memories increased** due to the placement of memory on chips.
- 3- Magnetic disks** replaced magnetic tapes for storing information.
- 4- New programming language** was developed which is called Basic.
- 5- The introduction of programming languages** enabled this third generation of computers to contain something called an **operating system**.
- 6- Minicomputer** appeared in the late 1960's.



The Fourth Generation 1970:

1- Large-scale integration (LSI) Circuit is a single chip contains thousands of transistors used in this generation.



2-Processor was placed on single chip called **microprocessor**. Other Functions, such as input, output, and memory, were placed on separate chips.



Fifth Generation 1990-:

- 1- Begin in the 1990's, when the Japanese perfect the **technology of parallel processing** to perform artificial intelligence operations.
- 2- Computer using in **image processing, neural network, sound recognition, and genetic application.**
- 3- The storage units are **very large and processors are speed enough** to perform high number of operations in millisecond.
- 4- **Robotics** now is made also in this generation.



Identifying Computer Types

As you learned in the preceding section, the hardware is the physical part of the computer system. The hardware consists of components inside a computer as well as the external devices that interact with it, such as printers, cables, and monitors.

Personal Computers

When most people think about computers, they picture a personal computer or PC. **This type of computer is called personal because it is designed for only one person to use at a time.**



Personal computers fall into **several categories** that are differentiated from one another by their sizes. The most common sizes are:

1- Desktop PC:

A computer designed to be used at a desk, and seldom moved. This type of computer consists of a large metal box called a **system unit** that contains most of the essential components, with a separate monitor, keyboard, and mouse that all plug into the system unit.



2- Notebook PC:

A portable computer designed to fold up like a notebook for carrying. The cover opens up to reveal a built-in screen, keyboard, and pointing device, which substitutes for a mouse. This type of computer is sometimes **called a laptop**.



A **smaller version of a notebook PC** is sometimes referred to as a **netbook** (which is short for Internet book, implying that this type of computer is primarily for accessing the Internet rather than running applications).

3- Tablet PC:

A portable computer that consists of a touch-sensitive display screen mounted on a tablet-sized plastic frame with a small computer inside. There is no built-in keyboard or pointing device; a software-based keyboard pops up onscreen when needed, and your finger sliding on the screen serves as a pointing device.



4- Smartphone:

A mobile phone that can run computer applications and has Internet access capability. Smartphones usually have a touch-sensitive screen, provide voice calls, text messaging, and Internet access.



Many have a variety of location-aware applications, such as a global positioning system (GPS) and mapping program, and a local business guide

Multi-User Computers

Multi-user computers are designed to serve groups of people, from a small office to a huge international enterprise. Here are some common types of multi-user computers:

1- Server:

A computer dedicated to serving and supporting a network, a group of network users, and/or their information needs. Many networks employ servers to provide centrally accessible storage space for data and share common devices like printers and scanners.

- A **small network server** may look **similar to a desktop PC** but may have a different operating system, such as **Windows Server or Linux**.
- A **large server** that manages a wide-ranging network may look **similar to a mainframe**.



- A **group of servers** located together in a **single room or facility** is called a **server farm**, or **server cluster**.
- **Large Internet service provider (ISP)** companies maintain extensive **server farms**.

2- Mainframe:

A large and powerful computer capable of processing and storing large amounts of business data. For example, a mainframe might collect all the sales data from hundreds of cash registers in a large department store and make it available to executives.

- The **modern mainframe unit** itself is a **large cabinet**, or a **series of cabinets**, each about the size of a refrigerator.
- A **mainframe** may be stored in its **own air-conditioned room** in a **business** or **school** and may have **multiple employees** monitoring and maintaining it.



In earlier decades, **smaller and less expensive multi-user computers** called **minicomputers** were employed in many businesses, but minicomputers are no longer widely used.

3- Supercomputer:

A supercomputer is the largest and most powerful type of computer available, occupying large rooms and even entire floors of a building. Supercomputers are often employed in fields such as **cryptanalysis** (code-breaking), **molecular modeling**, **weather forecasting**, and **climate mapping**.



Supercomputers typically are used in **high-tech academic, governmental, and scientific research facilities**.

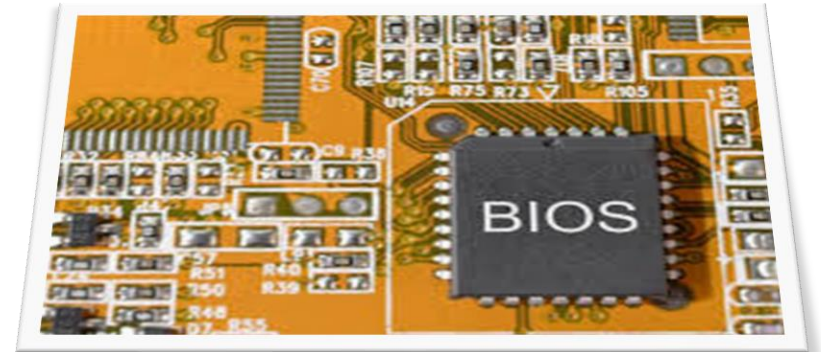
Understanding Software Types

Software tells the hardware what to do, but different kinds of software accomplish that at different levels. The following sections provide an overview of the types of software a computer might include.

1- BIOS

The most basic software is the **Basic Input Output System (BIOS)**.

This software is stored on a read-only chip on the motherboard so that it doesn't accidentally get changed or corrupted.



This important software **helps the computer start-up and performs some basic testing** on the hardware

2- Operating Systems

The operating system (OS) manages all the computer's activities after startup. The operating system serves several purposes:

- **It provides the user interface that humans use to communicate commands and receive feedback.**
- **It runs applications, and enables humans to interact with them.**
- **It controls and manages the file storage system.**
- **It communicates with the hardware, instructing it to take action to accomplish tasks.**



For example, the OS tells the printer to print a document, and tells the monitor what image to display.

Microsoft Windows is the most popular operating system. Other operating systems

1. **Mac OS** and **Linux** for desktop and notebook PCs.
2. **UNIX** for mainframes and servers,.
3. **Android** for tablets and smartphones.
4. **Special versions of Windows** and **Mac OS** also power tablets and smartphones.



Each operating system has its own unique set of features, benefits, and drawbacks, so it pays to learn as much as you can about the operating systems available and choose a computer that will run the operating system that best fits your needs.

3- Utilities

In addition to the main components of an operating system, **utility software may also be available, either provided free with the OS or added on. Utility programs assist with a wide range of system maintenance and security functions**, such as:

1. Checking storage disks for errors,
2. Blocking security and privacy threats,
3. Backing up important files.



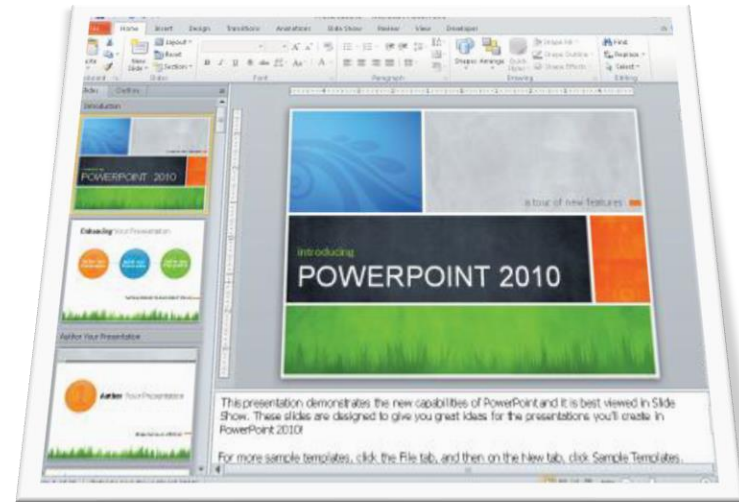
utility software that performs some useful service to the operating system, such as **optimizing or correcting the file storage system, backing up files, or ensuring security or privacy.**

4- Application Software

Is software that is designed to do something productive or fun, something of interest to a human user.

The OS keeps the computer running, but the applications give people a reason to use the computer.

- Most computers come with some application software already installed. You can purchase additional software, and many applications are available for free.
- The software may be provided on a CD or DVD disc, or may be downloaded and installed over from the Internet.



Perhaps the best known example in this software category is **Microsoft Office**, a suite of applications that includes a **word processor**, a **spreadsheet application**, a **database application**, and other applications.

The End